

**BEFORE THE INDEPENDENT HEARING PANEL APPOINTED BY THE
QUEENSTOWN LAKES DISTRICT COUNCIL**

UNDER the Resource Management Act 1991 (RMA)
IN THE MATTER of the Te Pūtahi Ladies Mile Plan Variation in accordance
with section 80B and 80C, and Part 5 of Schedule 1 of the
Resource Management Act 1991.

**STATEMENT OF REBUTTAL EVIDENCE OF AMY CATHERINE PRESTIDGE
10 November 2023**

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Introduction

- 1 My full name is Amy Catherine Prestidge. I am a Technical Principal Engineer (Water Conveyance) at WSP.
- 2 I prepared a statement of evidence on behalf of Queenstown Lakes District Council (**QLDC** or **Council**) dated 29 September 2023 on the submissions and further submissions to the Te Pūtahi Ladies Mile Plan Variation (**TPLM Variation**). My evidence considered the water supply, wastewater and stormwater servicing concepts for the TPLM Variation area (the **TPLM Variation Area**) and responded to submissions regarding water supply and wastewater.
- 3 I have the qualifications and experience as set out at paragraphs 5 and 6 of my statement of evidence dated 29 September 2023.
- 4 I repeat the confirmation given in my evidence that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023, and that my evidence has been prepared in compliance with that Code.

Scope of rebuttal evidence

- 5 In preparing this rebuttal statement, I have read and considered the evidence filed on behalf of submitters as that evidence relates to my evidence. I also attended the expert conferencing session on 1 November 2023 and have also read and considered the Joint Witness Statement produced at that expert conferencing session.
- 6 In this evidence I respond to the:
 - (a) Statement of Evidence of Callum Wood on behalf of Glenpanel Development Ltd (73) dated 20 October 2023.
 - (b) Statement of Evidence of Richard Regan on behalf of the Anna Hutchinson Family Trust (107) dated 20 October 2023.
 - (c) Statement of Evidence of Warren Ladbrook on behalf of the Anna Hutchinson Family Trust (107) dated 20 October 2023.
 - (d) Statement of Evidence of Warren Ladbrook on behalf of Glenpanel Development Ltd (73) dated 20 October 2023.
 - (e) The experts' joint witness statement (**JWS**) on infrastructure and engineering, dated 2 November 2023.

- (f) The memorandum on behalf of Glenpanel Development Limited responding to the infrastructure and engineering joint witness statement of 2 November 2023 dated 6 November 2023.

7 I have also considered the:

- (a) Statement of Evidence of Jana Davis on behalf of Kāi Tahu (100) dated 20 October 2023.
- (b) Statement of Evidence of Mike Hanff on behalf of Friends of Lake Hayes Incorporated (39) dated 20 October 2023.
- (c) Further questions set out in the Planning JWS dated 3 November 2023 that relate to stormwater.

Water Supply

Evidence of Mr Richard Regan (Anna Hutchinson Family Trust)

8 As is recorded in section 7 of the JWS, I agree with Mr Richard Regan that connection to the existing networks for water supply is technically feasible subject to consultation and acceptance by QLDC.

9 The Anna Hutchison Family Trust land could be serviced from the trunk network and reservoir proposed for construction to facilitate the development of the TPLM Variation Area. I have not undertaken analysis to understand the demand and precisely what additional pipe/reservoir sizing is necessary to include this additional land into the Water Supply design. However, I consider that it remains feasible to add this development area into the servicing design for Water Supply.

Evidence of Mr Callum Wood (Glenpanel Development Limited)

10 The evidence of Mr Callum Wood for Glenpanel Development Limited (**Glenpanel**) addresses water supply and wastewater servicing.

11 I agree with Mr Wood's evidence at paragraph 7 that Glenpanel's proposal (Flints Park) (**Glenpanel's Development**) could be partially served in the interim by the DN150 water pipe at the Stalker Road roundabout. However, more analysis would be necessary to ensure that the level of service to the existing properties served by this pipeline is maintained. Ideally Glenpanel's Development would be serviced from the new trunk water supply network prior to critical demand (yet to be determined) being reached so that the level of service to all consumers

is not put at risk. Council should require the disconnection of the interim DN150 pipe supply once the trunk main infrastructure is in place.

12 Mr Wood was unable to attend the expert conferencing. I have reviewed the responses by Mr Wood to the infrastructure and engineering JWS provided in the memorandum on behalf of Glenpanel responding to the infrastructure and engineering JWS dated 6 November 2023 and make the following additional comments.

- (a) In paragraph 5, Mr Wood comments that “I would be surprised if the existing reticulation (150mm) pipe could not supply the development...”. My review of Mr Wood’s calculations and a high level hydraulic assessment indicate that the DN150 pipe is likely to be undersized as the Glenpanel approaches full capacity. Therefore, I maintain my opinion that their land is likely to benefit from the trunk reticulation planned for the TPLM Variation Zone and the design should integrate with the overall zone network.
- (b) In paragraph 6 Mr Wood states that “the QLDC reports issued on the wastewater capacity and the ability to receive and transport across the bridge contradict this”. I disagree with Mr Wood that the QLDC reports contradict my evidence of there being finite spare capacity in the existing wastewater and water supply networks. It is clear in my report and in my evidence in chief that there is not unlimited ability for the existing pipes to service the developments proposed. Council will need to confirm who is able to utilise the existing capacity and at what point the new reticulation will need to be installed. As there is no indication of when the Glenpanel land is to be developed, accordingly the developer should consider that any spare capacity may not be allocated to them.

Wastewater

13 In relation to the evidence provided by Richard Regan (Anna Hutchinson Family Trust) and Callum Wood (Glenpanel) on wastewater, the agreements reached have been captured in the JWS, at sections 6 and 7.

14 I agree with both Mr Regan and Mr Wood that wastewater servicing is possible to both the Anna Hutchison Family Trust land and the Glenpanel land. I have not undertaken an analysis to understand the

infrastructure necessary to include the Anna Hutchison Family Trust land into the wastewater design, but servicing will likely be achieved either by discharging into the existing reticulation, or into the new pipeline through State Highway 6 (**SH6**).

- 15 In my opinion staging of new reticulation would be considered necessary, and best practice, to allow for early development to progress without impacting the condition or capacity of the existing infrastructure. Council agreement as to which pipes may be used now, and which new infrastructure requires construction at which time will be required. This is an activity that Council should consider promptly, as a strategy should be in place prior to detailed designs being undertaken by the developers.

Stormwater

- 16 Significant agreement was reached in the expert conferencing amongst myself, John Gardiner, Warren Ladbrook and Richard Regan in relation to stormwater. Sections 1 through 5 of the JWS provide the full context of the agreements reached.
- 17 Relating to the evidence by the above mentioned experts, I agree with the conclusions in the JWS that:
- (a) All development areas in the TPLM Variation area are to discharge the critical duration 1% Annual Exceedance Probability (**AEP**) event to ground, and that the number of devices to do so shall be the fewest necessary based on the staging of the full TPLM Variation Area.
 - (b) The Slope Hill catchment is to be considered independently from the development area in terms of soakage devices, with infiltration swales (or basins) used to provide both soakage to ground and a formalised overland flow path. The position of this soakage may increase the likelihood of slow infiltration rates, and therefore it is agreed that Slope Hill specifically may end up with less than the 1% AEP event being discharged to ground;
 - (c) In the event that less than the 1% AEP event is able to be discharged to ground, some overland flow towards Lake Hayes will occur. Due to the very infrequent occurrence of overland flow (unknown but likely to be less frequent than the 2% AEP event, or

50 year Average Recurrence Interval), there is unlikely to be any discharge to Lake Hayes except in very significant rainfall events;

- 18 The JWS also records the agreement between all the experts that:
- (a) For the TPLM development area, a fully integrated stormwater solution is to be co-ordinated across development blocks;
 - (b) For Slope Hill, stormwater can be dealt with by way of a planted infiltration swale on the Slope Hill side of the collector road;
 - (c) The recommended sediment control measures; and
 - (d) Recommended changes to the planning provisions, all of which I support and do not repeat in my rebuttal evidence.
- 19 Mr Gardiner's evidence provides further detail in relation to how integration of the stormwater can be achieved in light of the agreements reached in the JWS.
- 20 I have also reviewed the Planning JWS which asks a further question as to how secondary flow paths from Slope Hill will be managed if splitting into two integrated solutions, one each for Slope Hill and one for the TPLM Zone north of SH6.
- 21 A secondary flow path for the Slope Hill catchment would generally follow the swale alignment around the base of the hill, combining with the flow path from the development area in the TPLM Zone as it approaches McDowell Drive, as there is just the one optimum location for overland flow out of the TPLM Variation Area (north of SH6) based on ground levels. Therefore, it is likely that two secondary flow paths will exist within the TPLM Variation Area, but only one would exit the site towards Lake Hayes.
- 22 I also note that the Planning JWS notes that Mr Murray records the Queenstown Country Club installed a pipe and constructed a wetland on the lower Shotover Terrace that could potentially be available for stormwater purposes.
- 23 The reason the DN1050 Howards Drive stormwater pipe is not covered as a solution in my evidence is that there is limited capacity in the DN1050 Howards Drive pipeline and it is restricted in which TPLM Zone

properties' stormwater can be discharged into it.¹ QLDC has a documented agreement which addresses who is allowed to utilise this pipeline. It is therefore not considered a major discharge route for stormwater from TPLM.

- 24 Finally, in relation to stormwater from the Anna Hutchison Family Trust land, as noted in the JWS, this catchment is not within the TPLM catchment and therefore cannot be considered part of the integrated system for stormwater. However, I agree the principles of treatment and disposal should be in keeping with those proposed for TPLM stormwater if this area of land was to be included in the TPLM Variation.

Other evidence

- 25 For completeness the following section of my evidence addresses some of the other briefs of evidence that are relevant to my area of expertise.

Evidence of Mr Davis for Kāi Tahu

- 26 Paragraph 24 of the cultural evidence Mr Jana Davis for Kāi Tahu requests collaboration between development stakeholders, aiming to implement an integrated approach to improve the overall health of the lake ecosystem. I agree that collaboration between the development stakeholders is necessary. Given the requirements of the planning provisions for a fully integrated stormwater management solution, this will have to be occur through detailed design and the resource consenting process.
- 27 The TPLM Variation relies on stormwater disposal to ground (noting that water from Slope Hill may occasionally overflow towards the lake in less than the 1% AEP event). This means regular stormwater flows will not be discharged to the lake (and instead will be treated and discharged to ground). This approach will mean it is unlikely that any water will make it to the lake under normal rainfall events. It should be noted that in very large rainfall events (in excess of 1% AEP) where overland flow would likely enter the lake, the ability to treat the water of sediments and nutrients is low to nil.

¹ Refer to section 6.2 of the Te Putahi Ladies Mile Variation 3 Waters Servicing Concept Report (29 September 2023) for more detail on the arrangement private developers (including QCC who built the pipe) made as to who has permission to utilise this pipe.

28 Paragraph 30 of Mr Davis' evidence also touches on water supply in the context of "seeing cumulative effects from... water takes...(that) necessitate holistic management to prevent downstream consequences in our awa, wetlands and ecosystems."

29 In the case of water take for the TPLM Variation Area, the supply is not impacting or impacted by Lake Hayes specifically, and therefore has not been addressed further in this rebuttal evidence.

30 Mr Gardiner's evidence addresses Mr Bathgate's evidence for Kāi Tahu.

Evidence of Mr Michael Hanff for Friends of Lake Hayes

31 Page 3 of Mr Hanff's evidence suggests that SH6 is preventing flows from falling to the south (where he states "remove the risk of this by diverting storm water to under SH6 (out of Lake Hayes), where it would have gone prior to the construction of the highway").

32 This is incorrect. Topography does not suggest that runoff from Slope Hill crosses the TPLM Variation Area to SH6. Rather, the land within the TPLM Variation north of SH6 mostly falls east towards Lake Hayes, however noting there are likely to be small pockets of adjacent land that shed into the SH6 swales. It is also clear that at McDowell Road, the land rises towards the south, again encouraging flows to remain north of SH6. Evidence of this flow path is seen in the erosion gullies to the east of McDowell Drive towards Lake Hayes.

33 To give context to the following sections, it is noted that any reticulation necessary to convey flows towards Hayes Creek (rather than allowing overland flow into Lake Hayes) would only be sized to accommodate flows up to and including the 1% AEP event. This threshold is required by the QLDC's Code of Practice and is general practice across New Zealand.

34 It would be both difficult to install, and extremely expensive to construct, infrastructure for events larger than the 1% AEP event. It should also be noted that when discussing overland flow, I am only referring to flows that exceed the capacity of soakage systems. Maintenance of detention and soakage systems is important to ensure that the stormwater system performs as designed, otherwise an increase in the volume and frequency of overland flow would be expected.

- 35 At page 3 of Mr Hanff's statement he has stated that I am not a water quality expert and my statements regarding water quality should be disregarded.
- 36 In my opinion, Mr Hanff has mis-interpreted the evidence I have given. I am an engineer and work with engineered solutions to improve the quality of stormwater runoff.
- 37 There are two elements to treating stormwater: efficient capture and treatment solution applied. There is an array of treatment options available, but each performs differently in terms target contaminants and treatment effectiveness.
- 38 Input from a water quality specialist is often used to first baseline the contaminant levels and understand what level of reduction is deemed appropriate for the health of the receiving environment. Appropriate treatment devices are then selected to achieve this level of treatment.
- 39 In the case of the TPLM Variation and specifically regarding Slope Hill and the possible case where some flow in the 1% AEP event is unable to soak to ground, treatment may be less feasible, especially if efficient capture is not possible.
- 40 In the case of my evidence, noting that whilst disposal to ground is certainly the aim (which avoids any flows to Lake Hayes), it may not be a complete solution.
- 41 If the flow from Slope Hill is unable to be soaked to ground for rainfall up to and including the 1% AEP event, consideration should be given to how the additional flow is managed and if it can be discharged to Lake Hayes or would require diversion to Hayes Creek.
- 42 The decision to allow overland flow into Lake Hayes, or to require diversion through reticulation to Hayes Creek, is predicated on the understanding of whether any infrequent rainfall events (up to 1% AEP) can be allowed to enter Lake Hayes from a health of the lake position. This is where a water quality specialist comes in. If they determine that the overall reduction in contaminants from reduced inflows (by capturing all events up to the 1% AEP and disposing to ground) is enough to allow infrequent overflows from Slope Hill, then a piped diversion would not necessarily be required. This is a matter that would usually be resolved during the detailed design phase during the resource consenting

process. I note that the TPLM Variation provisions will require stormwater to be considered in the context of resource consent applications sought to develop the land within the TPLM Variation area and would expect that these matters would be further considered then.

- 43 Overall, the reduction in runoff making its way into Lake Hayes will result in “improvement” of the water quality from the TPLM Variation area simply because in most rain events it will be soaked into the ground and into ground water that flows away from Lake Hayes. I note that all of the experts in the JWS have agreed that the proposed stormwater solution is highly unlikely to worsen the water quality of Lake Hayes.
- 44 It should also be noted that whilst Mr Hanff believes no overland flows should be able to enter the lake, there will always be a risk that this will occur, no matter the engineering solutions installed. Short of significant re-formation of the land between the TPLM Variation area and Lake Hayes (which is not possible due to land ownership being outside the control of any of the parties associated with TPLM Variation Area), the low point will always remain. It is also not acceptable to force overland flow towards/over SH6 either, as this is a safety risk to emergency vehicles and Waka Kotahi have rules around preventing this.
- 45 The current catchment for TPLM includes both Slope Hill and the flat land which is to be developed. Whilst little can be done to change the properties of Slope Hill itself to reduce sediment and nutrient loading based on the current land use, the development land will change. The TPLM Variation Area will transition from pastoral use to urban uses. The sediment and nutrients will change because buildings and roads will be built. The way engineers manage stormwater in urban environments is different to farmland and is focused on collecting ‘first flush’ flows into treatment to treat things like heavy metals shed onto roads from vehicles. What this means is that the overall sediment load reduces because asphalt, concrete and impervious building materials do not shed sediment in high volumes like pastoral land is prone to. Therefore, the development will not contribute the same level and type of contamination that currently occurs.
- 46 Finally, the proposed solutions agreed upon in the JWS look to capture and discharge to ground (most) significant rainfall events. What this means is that there is only a 1-2% chance an overflow will occur within a given year.

Conclusion

- 47 The issues raised by the submitters evidence does not detract from the feasibility of the proposed three waters solution.
- 48 Coordination of three waters infrastructure across all development blocks (including those outside of TPLM) remains an essential step towards efficient servicing and operation.
- 49 Overland flow into Lake Hayes will occur for rainfall events beyond the design event. Where Slope Hill may require overland flow into Lake Hayes for lesser than the 1% AEP event, the water quality impacts to Lake Hayes will need to be understood and accepted during the detailed design phases. Conveyance infrastructure to Hayes Creek could be necessary to divert these flows away from Lake Hayes if the water quality impacts are deemed too substantial.

Amy Catherine Prestidge

10 November 2023